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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/765,952	01/29/2004	Shunpei Yamazaki	07977-247002	2326

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EXAMINER

BOOTH, RICHARD A

ART UNIT	PAPER NUMBER
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2812

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
3 MONTHS	02/08/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

Office Action Summary

Application No.

10/765,952

Applicant(s)

YAMAZAKI ET AL.

Examiner

Richard A. Booth

Art Unit

2812

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 26 January 2007.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 37-48,61 and 62 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 37-48,61 and 62 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- ☐ Notice of References Cited (PTO-892)
- ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- ☐ Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date _____
- ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date _____
- ☐ Notice of Informal Patent Application
- ☐ Other: _____

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 01/26/07 has been entered.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 37-44, 46-48, and 61-62 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yamazaki et al., U.S. Patent 5,821,138 or Yamazaki et al., JP 08-288522 in view of Yoshikazu, JP 08-293598.

Yamazaki et al. shows the invention substantially as claimed including a method of making a semiconductor device, comprising the steps of: forming a crystalline semiconductor film over an insulating surface, wherein said crystalline semiconductor film forming step comprises the steps of: forming an amorphous semiconductor film 304 over said insulating surface; holding catalytic elements 305 that promote the

crystallization of said amorphous semiconductor film on said amorphous semiconductor film; crystallizing said amorphous semiconductor film through a heat treatment to transform said amorphous semiconductor film into a crystalline semiconductor film (see fig. 11C); and gettering said catalytic elements remaining in said crystalline semiconductor film to a processing atmosphere through a heat treatment in an atmosphere containing halogen elements therein (see fig. 11D); and introducing elements from group XV into the semiconductor layer in order to form a source and drain region (see fig. 2A and col. 8-lines 43-56, and col. 15-line 39 to col. 18-line 50).

Both Yamazaki et al. references fail to disclose adding impurity elements that shift an energy band of said crystalline semiconductor film to a portion of said crystalline semiconductor film which will come to an active region later to locally form an impurity region; wherein said impurity region is formed so as to extend between source and drain regions, and at least two channel regions are separated from each other by said impurity region.

Yoshikazu discloses adding impurity elements that shift an energy band of said crystalline semiconductor film to a portion of said crystalline semiconductor film which will come to an active region later to locally form an impurity region; wherein said impurity region is formed so as to extend between source and drain regions, and at least two channel regions 7 are separated from each other by said impurity region (see abstract and figures). In view of this disclosure, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the process of the Yamazaki et al. references so as to form the impurity region of Yoshikazu because in

such a way a channel region having multiple threshold voltages can be fabricated in a single photolithographic step.

Concerning the particular order of the gettering and introduction of elements, the selection of any order of performing process steps is prima facie obvious in the absence of new or unexpected results.

Regarding the concentration of impurities, generally, differences in concentration or temperature will not support the patentability of subject matter encompassed by the prior art unless there is evidence indicating such concentration or temperature is critical.

Furthermore, with respect to the relative arrangement of the impurity region and the grain boundary, it is believed that inherently at least a portion of the impurity region will be parallel to at least a portion of the grain boundary since in general the grain boundary is randomly oriented.

Claim 45 is rejected under 35 U.S.C. 103(a) as being unpatentable over Yamazaki et al., U.S. Patent 5,821,138 or Yamazaki et al., JP 08-288522 in view of Yoshikazu, JP 08-293598 as applied to claims 37-44, 46-48, and 61-62 above, and further in view of Singh et al., U.S. Patent 5,843,811.

Yamazaki et al. '138 and '522 and Yoshikazu are applied as above but do not expressly disclose the face of the semiconductor film being (110).

Singh et al. discloses the face of a semiconductor film being (110) (see col. 3-lines 55-64). In view of this disclosure, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the process of Yamazaki et

al. '138 and '522 and Yoshikazu so as to have the claimed semiconductor face because forming the semiconductor with such a face produces a film with high mobility.

Response to Arguments

Applicant's arguments filed 01/26/07 have been fully considered but they are not persuasive. With respect to the relative arrangement of the impurity region and the grain boundary, it is believed that inherently at least a portion of the impurity region will be parallel to at least a portion of the grain boundary since in general the grain boundary is randomly oriented.


Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Richard A. Booth whose telephone number is (571) 272-1668. The examiner can normally be reached on Monday-Thursday from 7:30-6:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Michael Lebentritt can be reached on (571) 272-1873. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Art Unit: 2812

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.



Richard A. Booth
Primary Examiner
Art Unit 2812

February 3, 2007